

Special Issue!
for ZX-81/TS-1000

THE SINCLAIR/TIMEX USERS MAGAZINE

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Volume IV

MAY 1986

Number 5



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THE SINCLAIR/TIMEX USERS MAGAZINE

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MIDWEST TS COMPUTERFEST A SUCCESS!

Just as the future of our computers grows dim again, the Midwest TS Computerfest comes along and brightens things up!

With more than 25 dealers and groups with displays and more than 350 registered families in attendance (500-600 people actually showed), the show proved that support for the Sinclair/Timex line is far from being over.

Supporters of the entire line of computers were there. From the old ZX-80 and Jupiter Ace to the QL, if you needed something for them, it was probably there.

A map of the US and Ohio pinpointed where visitors of the show were from. People as far away as Oregon and California showed up and many came from New York, Nebraska, Florida, Michigan, and Canada. Of course, most came from Ohio and Kentucky.

Most of the major advertisers were there, from Aerco to Zebra and many in between. Several user groups as well as all of the US magazine supporters were also there. Media support included local coverage as well as the Wall Street Journal and Mark Fendrick of Computer Shopper and ZX Computing.

Here is a list of dealers who attended:

* A+ Computer Response was there showing their full support for the QL line and authorized dealers.

* Aerco was there with several full blown systems with their most recent disk interfaces running CP/M in 80 column mode.

* Brice Road Pharmacy was there with a full QL line of hardware and software.

* Budget Robotics was there with their Buffered Buss Expansion Board for the 81/1000/1500.

* Budgetsoft, who is known for their Fish Locator program, now provides the solunar table data from that program to resorts and newspapers all over the country. They were there showing their program.

* Computer Trader Magazine had Chet Lambert there with recent and back issues.

* Detroit User group made a good showing with the Amdek Plotter.

* Dave Macarone of Damco Enterprises demonstrated the Rotronics Wafadrive for the Spectrum/2068.

* E. Arthur Brown had their most recent catalog covering the TS line.

* English Micro Connection had their most recent catalog covering the Spectrum/2068 and QL.

* G. Russell Electronics had their Winky Board, ROM switch, and QL products on display.

* The Greater Cleveland Area Sinclair User Group had software on display.

* The Indiana Sinclair Timex User Group was there with Frank Davis looking to expand their group.

* Knighted Computer had their 2068 converted Spectrum software and QL products.

* RMG Enterprises had their most recent catalog available.

* SMUGWARE Conversions was taking orders for converting programs to the Aerco disk system.

* We at SUM had our Best Of SUM and back issues available.

* Sharp's had QL products along with their own software for it.

* Syncware News was there with back issues and ProFile on cartridge by Tom Woods and Bank switched RAM by Tom Bent.

* TS Connection was there with Timex hardware and software.

* TS Horizons was there with back and current issues of their Magazine.

* Time Designs was there with back and



People and products in every direction



The "team" from A Plus Computer Response



Dave Macarone pushing the Rotronics Wafadrive



Syncware News hardware display



Zebra's booth — lots of product!



Variety Sales booth — super show specials

current issues and the Timex Technical Manual.

* Variety Sales was there with QL and 2068 products.

* WMJ had their current catalog available.

* The Widjup Co. had Software for the 81/1000/1500 and 2068.

* Zebra Systems had the largest display with software, hardware, and books for the 81/1000/1500 and 2068.

No one had any idea that the show would be such a success and many of the dealers actually ran out of merchandise the first day. By the end of the second day, merchandise was being heavily discounted with brand new 2040 printers being sold for \$20.40 and entire QL systems going for as low as \$600!

Everyone at the show agreed that the market for the Sinclair/Timex community is anything but dead. The interest generated a lot of enthusiasm and should bring about more product development. Even at the show, new products made their debut for all computers involved.

Because of the success of the show, another one has already been planned for next year at the same time and place. So, if you missed this one, you will have another chance.

With the recent announcement of the Amstrad takeover of Sinclair, rumours were flying as to what would happen to the Spectrum + and QL. Amstrad is going to support the Spectrum and is already planning new generations of the Spectrum. Some such plans include adding a better keyboard and coming out with a games only machine.

The QL is still up in the air as far as Amstrad is concerned because it competes with their own computer. They would like someone to take over that division in Europe.

A+ Computer Response, the new US distributor for the QL provided an entire QL package as the grand prize for the Show.

A+ Computer Response previously sold IBM's and their clones as well as Apple computers. They became interested in the QL when they learned that Sinclair was trying to market them here in the states.

They thought they could provide better support in the American market being based here. A+ signed with Sinclair just before the Amstrad deal.

After talking with Carol and George Whitham (who head A+) at the show, I am convinced that they are indeed committed to the success of the QL in the American market. They purchased the entire inventory of US Sinclair products and expect to have enough inventory to last for quite some time.

A+ was very impressed with the show and plans to hold shows of their own in the coming months with some possible locations being New York and North Carolina.

A dealer network has already been set up to support the QL with twelve dealers already in place (see A+ Computer Response ads).

A+ is definitely looking to keep the QL alive and well, and with dealer and user support continuing, we can look for second generation QL's which, of this writing, are already planned in the European market by third party supporters over there.

-- Joe Williamson

Backgammon Reviewed

John Burn's BACKGAMMON is a 100% machine code program put out by Biocal Software, Inc. The program takes about 6 1/2 minutes to load and self starts.

The program comes up running with the title and copyright notice. You are then greeted by the board and asked if you want the dice to be rolled by the computer or by you. Then each player rolls one die and the player with the higher roll goes first.

You start play by choosing whether you want to double the stakes by doubling the cube (if you won possession of the cube) or roll the dice. The board is labeled with the letters B thru Y. To move, you press the letter by the piece you wish to move.

When the computer is waiting for a move, it asks From?, and when you answer, it says To? to cut down on the number of keystrokes. All forced moves are done for you.

The game board looks a lot like a Backgammon board despite the graphics available. It has a fast response time

between moves. This is one of those games that can go on for hours and hours of trying to win a game against the computer. Very challenging.

The instructions state that the program also contains a monitor/disassembler built in and that machine code hackers may write to Biocal for more information on using same for their own programs.

Available from Biocal Software, Inc. PO Box 965, Stinson Beach, CA 94970. Works on the ZX80 with 8K ROM, ZX81, TS1000/1500.

-- Joe Williamson

Checkbook Balancer Old Standby Reviewed

CHECKBOOK BALANCER will help you keep your account in order in a simple way. You can take your checkbook and enter it into this program and keep it up to date by entering bank charges, deposits & debits.

The program is very simple to use and comes with a keyboard overlay with listings like TRANSaction, BALance, VOID, CLEAR, -, +, ., SAVE, and Enter. You just

hit the - key for debits and the + key for deposits and the CLEAR key for clearing out past transactions.

The program is in machine code and is pretty fast. Reconciling your checkbook is made easy. If you have a printer, the display is copied each time you list the TRANSactions or BALance. The data can be saved along with the program for future updates.

On the flip side of the tape is a program called GRAPHIC CHECKBOOK which will display in a bar graph any parameters you enter.

You enter the highest number you expect the graph to display, label the top and bottom of the graph with name and period and enter the data. The graph is updated each time you enter data. The graph can then be printed out on the printer and saved for future reference.

CHECKBOOK BALANCER and GRAPHIC CHECKBOOK are both for the ZX80 with 8K ROM, ZX81, TS1000/1500 and 2K or more memory. They are available from SIMULUSION, BOX 2382, La Jolla, CA 92038.

-- Joe Williamson

Math Tutor Program for Youngsters

Here is a program that quizzes 7 to 10 year olds in addition and subtraction at different levels and keeps score. If you get the correct answer, you are rewarded. It was written by Tom Bingel.

REM FOOTE SOFTWARE PRESENTS
- FUN MATH TUTOR -
COPYRIGHT 1984 BY FOOTE SOFTWARE

```
1 RAND
2 GOTO 4
3 SAVE "FUN MATH TUTOR"
4 SLOW
5 GOSUB 400
6 GOSUB 300
7 GOSUB 500
8 GOSUB 800
9 GOSUB 300
10 GOSUB 900
15 GOSUB 300
20 GOSUB 1000
30 DIM A$(16)
34 LET U=16
35 LET AB=0
36 LET Z=LEN STR$ VAL T$
40 PRINT AT 8,17-Z;T$
45 PRINT AT 9,16-Z;F$(F)
50 PRINT AT 9,17-LEN STR$ VAL
L$;L$
```

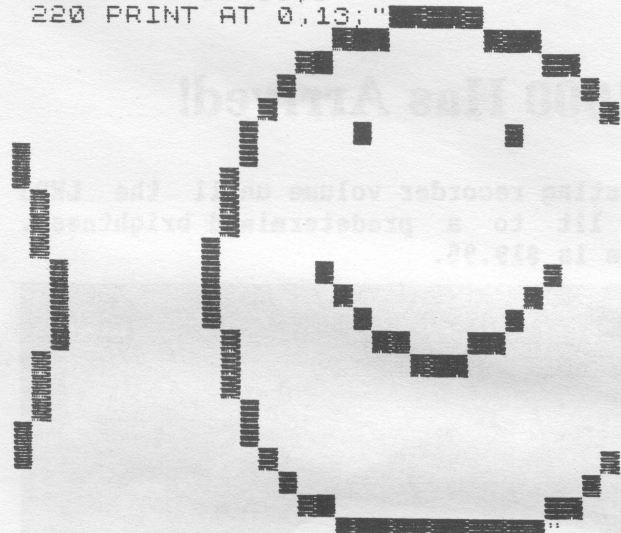
```
55 PRINT AT 9,16-Z;F$(F)
60 PRINT AT 10,16-Z;"(4-Z
TO 4)
65 IF U<12 THEN LET U=12
71 PRINT AT 11,U;" "
72 IF INKEY$(">") THEN GOTO 100
80 PRINT AT 11,U;" "
81 PRINT AT 11,U;" "
90 IF INKEY$="" THEN GOTO 65
100 LET K#=INKEY$
110 IF CODE K#=118 AND A$(">")
" THEN GOTO 140
111 IF CODE K#=119 THEN LET U=U
+1
112 IF U>16 THEN LET U=16
113 IF CODE K#=119 THEN LET A$(
U)=" "
114 IF CODE K#=119 THEN GOTO 65
115 IF 28>CODE K$ OR CODE K$>37
THEN GOTO 65
120 PRINT AT 11,U;K$
121 IF U=12 THEN GOTO 65
122 LET A$(U)=K$
125 LET U=U-1
130 GOTO 65
140 LET B#=T#+F$(F)+L$
142 IF VAL A$=VAL B$ THEN LET A
B=1
144 IF AB=0 THEN LET NU=NU+1
145 IF AB=1 THEN LET NR=NR+1
```



```

155 IF AB=1 THEN PRINT AT 18,11
;"CORRECT"
157 IF AB=0 THEN PRINT AT 18,4;
"WRONG, THE ANSWER IS:";VAL B$
160 GOSUB 1000
161 IF AB=0 THEN GOTO 165
162 FOR A=1 TO 10
163 NEXT A
164 GOSUB 200
165 GOSUB 900
168 IF AB=0 THEN PRINT AT 20,0;
"PRESS ENTER KEY TO CONTINUE..."
170 IF AB=1 THEN GOTO 185
175 IF INKEY$="" THEN GOTO 175
185 CLS
190 IF C=11 THEN GOSUB 1200
195 IF C=11 THEN GOTO 6
199 GOTO 15
200 REM PRINT FACE
210 POKE 16418,0
220 PRINT AT 0,13;"

```



```

225 IF NOT (R$="1" OR R$="4") T
HEN GOTO 298
230 FOR A=1 TO 50
240 NEXT A
298 POKE 16418,2
299 RETURN
300 REM
320 PRINT AT 2,1;"- FOOTE SOFTW
ARE MATH TUTOR -"
399 RETURN
400 REM
410 PRINT AT 4,3;"FOOTE SOFTWAR
E PRESENTS:"
420 PRINT AT 11,7;"FUN MATH TUT
OR"
440 PRINT AT 21,0;"COPYRIGHT 19
84 BY FOOTE SOFTWARE"
450 FOR A=1 TO 100
460 NEXT A
480 CLS
490 GOSUB 1300
499 RETURN
500 REM MENU
510 PRINT AT 5,13;"MENU"
520 PRINT AT 7,0;"PRESS:"
525 PRINT
530 PRINT "1 - FOR SEQUENTIAL A
DDITION BY 1"
540 PRINT "2 - FOR ADDITION SUC
H AS 7+3"
550 PRINT "3 - FOR ADDITION SUC
H AS 722+51"
560 PRINT "4 - FOR SEQUENTIAL S
UBTRACTION BY 1"
570 PRINT "5 - FOR SUBTRACTION
SUCH AS 7-3"

```

```

580 PRINT "6 - FOR SUBTRACTION
SUCH AS 722- 51"
585 LET R$=INKEY$
590 IF 29<=CODE R$ AND CODE R$<
=34 THEN GOTO 598
595 GOTO 585
598 CLS
599 RETURN
600 REM VARS
610 DIM F$(2)
612 LET F$(1)="+ "
614 LET F$(2)="- "
620 LET T=0
625 LET NR=0
630 LET L=1
635 LET NU=0
640 LET C=0
650 DIM T$(3)
655 IF R$="1" THEN LET T$="-1 "
657 IF R$="4" THEN LET T$="0 "
660 DIM L$(3)
665 LET L$(1)="1"
669 DIM D(6)
670 LET D(1)=0
671 LET D(2)=10
672 LET D(3)=1000
673 LET D(4)=0
674 LET D(5)=10
675 LET D(6)=1000
680 LET F=1
685 IF R$="4" OR R$="5" OR R$="
6" THEN LET F=2
690 LET R=0
692 DIM A$(16)
694 DIM B$(16)
696 LET B$="1"
698 LET A$(16)="0"
699 RETURN
900 REM GENERATE
901 REM GEN T$
902 LET C=C+1
903 LET D=D(VAL R$)
905 IF D=0 THEN LET T$=STR$ ((V
AL T$)+1)
910 IF D=0 THEN RETURN
915 LET T$=" "
920 LET T=INT (D*RND)
925 IF T>=100 THEN LET T$=STR$
T
930 IF 100>T AND T>=10 THEN LET
T$(2 TO 3)=STR$ T
935 IF 10>T THEN LET T$(3)=STR$
T
950 REM GEN L$
952 LET L$=" "
955 FOR A=1 TO 3
960 IF T$(A)=" " THEN GOTO 970
965 LET L$(A)=STR$ INT (VAL T$(
A)*RND)
970 NEXT A
975 LET L=VAL L$
980 LET L$=STR$ L
990 LET T$=STR$ VAL T$
999 RETURN
1000 REM PRINT SCORE
1030 PRINT AT 4,0;"SCORE:";TAB 1
0-LEN STR$ NR;NR;" CORRECT";TAB
25-LEN STR$ NU;NU;" WRONG"
1099 RETURN
1200 REM END TALLY
1205 CLS
1210 GOSUB 300
1215 GOSUB 1000
1220 PRINT AT 8,0;N$;" "
1230 PRINT AT 10,0;" YOUR SCORE
OF ";NR;" CORRECT IS"
1240 IF NR=10 THEN PRINT "EXCELL
ENT."
1245 IF NR=8 OR NR=9 THEN PRINT
"VERY GOOD."

```

```

1250 IF NR=7 THEN PRINT "GOOD."
1255 IF NR=5 OR NR=6 THEN PRINT
"FAIR."
1260 IF NR<=4 THEN PRINT "IN NEE
D OF IMPROVEMENT."
1265 FOR A=1 TO 30
1266 NEXT A
1270 PRINT AT 20,0;"PRESS ENTER
KEY TO CONTINUE..."
1280 IF INKEY$="" THEN GOTO 1280
1295 CLS
1299 RETURN
1300 REM NAME
1310 CLS
1320 GOSUB 300
1330 PRINT AT 8,0;"TYPE YOUR NAM
E BELOW: (USE SHIFTAND DELETE TO
MAKE CORRECTIONS)"

```

```

1335 PRINT AT 11,0;"PRESS THE EN
TER KEY."
1340 INPUT N$
1350 CLS
1355 GOSUB 300
1360 PRINT AT 5,0;"HELLO ";N$;";
"
1370 PRINT AT 7,0;" WELCOME TO
FOOTE SOFTWARES ""FUN MATH TU
TOR""."
1375 PRINT AT 6,27;";"
1380 FOR A=1 TO 9
1385 PRINT AT 16,3*A;A
1390 NEXT A
1392 FOR A=1 TO 6
1393 NEXT A
1395 CLS
1399 RETURN

```

Mass Storage on the TS-1000 Has Arrived!

One of the most memorable moments I have of my TS1000 is the day I brought it home from the store. Carefully setting everything up according to instructions, I proceeded to load the included tape in the recorder and turn it on. NO LOAD! It was 45 minutes before I finally got it to load. This is the unfortunate memory of many users.

Surveying the situation in the TS1000 market, we've found a number of alternatives to the original "slow-load" cassette as provided by Sinclair.

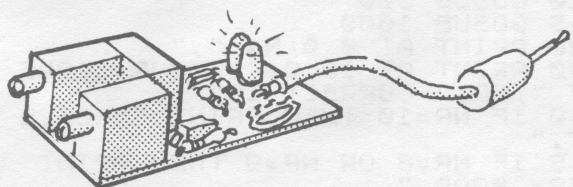
IMPROVEMENTS TO THE CASSETTE SYSTEM. G. Russell Electronics offers two products that enhance the basic cassette loading method. ZXLR8 Fastload is a high speed save and load utility. Programs can be saved then loaded at 6-10 times normal speed. This 2K piece of code is user friendly, is relocatable in memory, and requires no hardware changes or additions. It does require a good recorder and quality tape. It is also available on an EPROM. Cassette version is \$10.50. The Winky Board is a long popular interface that fits between the recorder and the computer. A small circuit board with two LEDs and several jack inputs, the Winky Board filters the signal for an easier load and also allows more consistent loading from one tape to another simply by

adjusting recorder volume until the LEDs are lit to a predetermined brightness. Price is \$19.95.



MICRODRIVES. The A & J Microdrive is effectively a high-speed endless cassette save/load system. A 28K program can load as quickly as 24 seconds. Many programs can be adapted to microdrive and some even are available on microdrive "wafers". Up to two drives can be attached to the TS1000. A Starter Kit consists of 1 drive, an interface for a second drive, 5 wafers, manual, and wafer storage box. Kit price is \$149.50 with the second drive costing \$99.50. Wafers are \$3.50 to \$4.50 each. Several T/S dealers carry the Microdrives, or they can be purchased direct from A & J.

DISK DRIVES. Two disk drive systems are available for the TS1000 family. The Aerco



system has been around the longest and is a respected system. Cost for the interface is \$179 or Aerco will sell complete systems including drives and power supply. New is the Larken interface from Canada. It claims to be more user friendly and versatile than Aerco. It loads 32K in 7.5 seconds and uses no TS1000 RAM memory. Price for the controller is \$99 direct from Larken.

Honestly now, is it worth all the trouble to add disk drives or even a microdrive to the TS1000? Yes! If you are already happy with your computer and enjoy it, why not? NO! If you think that adding faster mass storage will turn it into an IBM. Do remember that the disk drives and power supply can probably be used with your next computer system, especially if it is a TS2068, Spectrum, or QL!

G. Russell Electronics, RD 1 Box 539, Centre Hall, PA 16828; 814/364-1325.

A & J 1050 "I" E. Duane Avenue, Synnyvale, CA 94086; 408/732-9292.

Aerco, Box 18093, Austin, TX 78760; 512/451-5874.

Larken Electronics, RR #2, Navan, Ontario Canada K4B-1H9.

"Ephemeris V" — Review of an Astronomy Program

The U. S. Naval Observatory annually produces a book that tells the positions of all the major celestial objects for the year of publication. It was formerly titled The Ephemeris and Nautical Almanac, but a few years ago its name changed to The Astronomical Almanac. To die-hards it is still the "Ephemeris".

With that in mind, you can appreciate the audacity of a programmer who dares to call his/her creation by that name. In addition, the output of the program is claimed to be accurate for a 100 year spread from 1920 to 2020. The U. S. Naval Observatory has to update its calculations on a daily basis!

The astronomers at Mount Palomar probably don't use this program and a Timex computer to make cosmological discoveries. But the backyard astronomer can use "Ephemeris V" to unravel the mysteries of the night sky with an accuracy better than many planetarium projectors.

The program begins by asking the user to identify his or her place in time and space: latitude, longitude, date, and local (24 hour) time. A thoughtful reminder prompts you to subtract an hour for Daylight Savings Time. Since "Ephemeris V" is advertised as a planet finder, the first choice you make is which planet to locate. The most prominent planet as spring 1986 began was Venus.

The planet menu clears, and a nicely organized table of information takes its place. This table summarizes the initial entries, the current phase of the Moon, the observer's sidereal (star) time, and the constellation in which the planet is found. It tells you how to find Venus in three different languages. For astronomers, there are equatorial coordinates (right ascension and declination); for navigators, horizon coordinates (altitude and azimuth); for the novice observer, plain English (direction and height).

The next screen lets the user select a variety of different observing conditions, objects to observe, or, most impressive, the originally chosen planet graphically displayed in a computer generated "sky". A short machine code routine paints the screen black, and a fifty degree spread of the "ecliptic", the plane of the solar system, is plotted. The constellations are identified by name, and a flashing "0" shows the position of the planet in question.

"Ephemeris V" is the only T/S 1000 astronomy program I have (out of about 16) which bothers to create white "stars" in a black "sky". Use it to amaze your friends. You don't have to know very much astronomy to know more than your next door neighbor. You might well ask, "Will I be able to distinguish the real planets from the real stars in the real sky when I use 'Ephemeris V'?" Surely. Mother never told you, "Twinkle, twinkle, little planet," did she?

"Ephemeris V" is available from Robotec, Inc., 59 C Street, Ampoint Industrial Park, Perrysburg, OH 43551.. Works on the 16K TS-1000, ZX-81, and TS-1500. Price: \$14.95.

-- Duncan R. Teague

Adding a Full Size Printer to Your System

Today, dot matrix printers are available from many sources at very reasonable prices. Many TS1000/1500 users are still using the TS2040 as their only printer. Now may be the time to upgrade. Let's consider some of the possibilities.

First, there is a product now available for those who already have a dot matrix printer, in particular the Gorilla Banana or Seikosa 100. There is now a simple chip plug-in available that can give a considerably better looking printout on these printers by giving characters such as "y" and "g" true descenders. For those who love their printers and are willing to spend \$14.95 to upgrade them, contact RMG Enterprises, 1419 1/2 7th Street, Oregon City, OR 97045.

Of course, those who fit the bill of the paragraph above must have a "printer interface" which allows them to use a full size printer. This is the first requirement to adding a printer. Because the TS1000/ZX81 and family use non-standard codes to represent characters, interfaces generally cost more than on the TS2068 in order to translate these codes into something the printer understands.

Interfaces that have been available for some time include the Aerco Centronics and Aerco RS-232C Serial (at \$99 each) and the Byte-Back Centronics (\$89.95) and RS-232 Serial (\$69.95). Generally, printers with centronics parallel interfaces are less expensive and so would dictate choosing this type interface. The above interfaces are available from their manufacturers as well as RMG Enterprises, Sunset Electronics, and other TS dealers.

Another of the original TS interface manufacturers was Memotech which manufactured both types of interfaces as well. Word from several sources is that Memotech products are once again available from Oxford Data. These were excellent interfaces and well worth considering.

Do you have a TS2068 and printer interface? GOOD NEWS! You can now use that 2068 printer interface on your TS1000/ZX81 as well! What's the catch? Only that you will have to buy a software utility called the "Universal Printer Driver" to use them. It is available from Fred Nachbaur

(\$16.95) or E. Arthur Brown. Even if you don't yet have a printer interface for your 2068, this might just be what will cause you to take the plunge--one interface that can work with both computers. The only exception are those interfaces which plug into the cartridge port of the TS2068, since the TS1000 family has no such port. The UPD software supports COPY, LPRINT, and LLIST and allows the 512 byte program to be relocated anywhere in memory to make it compatible with most software.

Hopefully, this article will encourage more users to move up to the advantages of a full-size printer using standard bond paper.

Fred Nachbaur, C-12, Mtn. Station Group Box, Nelson, BC V1L 2J3 Canada.

Oxford Data, 99 Cabot Street, Needham, MA 02194.

Aerco, Box 18093, Austin, TX 78760.

Sunset Electronics, 2254 Taraval Street, San Francisco, CA 94116.

E. Arthur Brown Co., 3404 Pawnee Dr., Alexandria, MN 56308.

Byte-Back Co., Rt. 3, Box 147 Brodie Rd., Leeville, SC 29070.

-- Richard Cravy

Banners on the TS-2040

Here is a program that will allow you to input a message and have it print out the message as a banner on the 2040 printer.

The letters are generated one at a time by PEEKing at the letter to be generated in the ROM, making it 8 times normal size and turning it on it's side and then COPYING it to the printer.

The program is much faster in FAST mode, but you can't see the letter forming. By changing line 128, you can change the character that is actually used in printing the large one.

Enter the program as listed and use GOTO 280 to SAVE it so that it will self start next time it's LOADED.


```

10 PRINT "INPUT MESSAGE"
20 INPUT M$
30 LET LEN=LEN M$
40 FOR L=1 TO LEN
50 LET CH=CODE M$(L)
60 LET R=7680+(CH*8)
63 LET A=1
67 LET B=1
70 FOR R=R+7 TO R STEP (-.25)
80 LET RC=PEEK R
90 FOR H=1 TO 7
100 LET D=RC
110 FOR G=1 TO 3
120 IF G=2 OR 3 THEN LET RC=D
130 LET CNTR=0
140 IF RC<128 THEN GOTO 170
150 LET CNTR=128
160 LET RC=RC-128
170 LET RC=RC*2
180 PRINT AT A,B;CHR$ CNTR;
190 LET A=A+1
200 NEXT G
210 NEXT H
220 LET A=1
230 LET B=B+1
240 NEXT R
250 COPY
260 NEXT L
270 STOP
280 SAVE "BANNE"

```

-- Joe Williamson

Math Function Graphing

Here is a program written by Tom Bingel you can type in to graph complex equations such as trigonometric and polynomial functions. The plots are printed on the screen and on the printer if you have one.

Note that programs with great curvature (that changes values rapidly) may not be reproduced accurately by the computer due to its limited graphics ability.

Due to the inability of the ROM to handle powers of negative numbers, a special routine is added to compensate for this inadequacy. However, there are some rules for expressing the function $f(x)$:

1. $f(x)$ must have all variables in terms of x . Examples: $3*X+2$; $7*X**3-X**2+1$

2. Exponents (powers of X must be positive integers not greater than 9. Use $1/X$ for negative exponents.

```

0 REM FOOTE SOFTWARE PRESENTS
1 -MATH FUNCTION GRAPHER-
COPYRIGHT 1983 BY FOOTE SOFTWARE
5 REM GRAPH
10 GOSUB 900
13 GOSUB 1200
15 GOSUB 100
30 GOSUB 400
50 GOTO 13
60 REM AUTO-START
70 SAVE "MATH FUNCTION GRAPHE"

```

```

80 SLOW
90 RUN
100 PRINT AT 19,0;"ENTER FUNCTI
ON:"
110 PRINT AT 21,0;"F(X)="
120 INPUT A$
122 DIM B$(99)
123 LET C=0
124 FOR A=1 TO LEN A$
125 IF A$(A)<>"**" THEN LET C=C
+1
126 IF A$(A)<>"**" THEN LET B$(
C)=A$(A)
127 IF A$(A)<>"**" THEN GOTO 13
9
128 FOR B=1 TO VAL A$(A+1)-1
130 LET C=C+1
131 LET B$(C)="*"
132 LET C=C+1
133 LET B$(C)=A$(A-1)
137 NEXT B
138 LET A=A+1
139 NEXT A
140 PRINT AT 19,0;"ENTER RANGE
OF X:"
150 PRINT AT 21,0;"FROM X="
160 INPUT X1
170 PRINT AT 21,0;"TO X="
180 INPUT X2
190 CLS
199 RETURN
300 REM
310 LET FA=0
315 LET X=X1
320 FOR M=L1 TO L2
325 LET X=X+R/(L2-L1)
330 IF ABS VAL B$>FA THEN LET F
A=ABS VAL B$
350 NEXT M
360 LET S=18/FA
390 RETURN
400 REM
402 FAST
405 GOSUB 600
410 LET L1=((RX+X1)/(2*RX))*64-
1
415 IF L1<0 THEN LET L1=0
420 LET L2=((RX+X2)/(2*RX))*64-
1
425 IF L2>63 THEN LET L2=63
426 GOSUB 300
427 SLOW
428 GOSUB 500
429 LET X=X1
430 FOR M=L1 TO L2
435 LET X=X+R/(L2-L1)
440 LET N=S*VAL B$+20
450 PLOT M,N
470 NEXT M
490 PRINT AT 0,0;"F(X)=";A$
491 FOR A=1 TO 20
492 NEXT A
493 LPRINT
494 COPY
495 FOR A=1 TO 100
496 NEXT A
498 GOSUB 1000
499 RETURN
500 REM
510 FOR M=0 TO 63
520 PLOT M,20
530 NEXT M
540 FOR N=0 TO 41
550 PLOT 30,N
560 NEXT N
570 PRINT AT 10,31;"X"
580 PRINT AT 1,11;"F(Y)"
585 PRINT AT 12,0;"-";RX;TAB 32
-LEN STR$ RX;RX

```

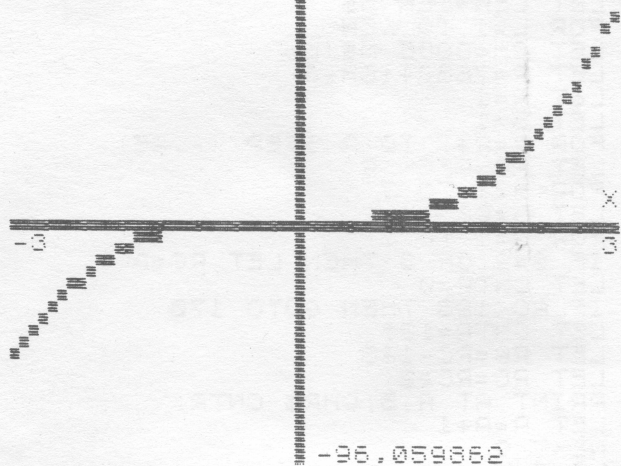
```

587 PRINT AT 1,16;FA;AT 21,16;"
-";FA
599 RETURN
600 REM
610 LET X3=ABS X1
620 LET X4=ABS X2
630 LET R=X3+X4
640 IF X3>X4 THEN GOTO 670
650 LET RX=X4
660 GOTO 680
670 LET RX=X3
680 RETURN
900 REM
910 PRINT AT 2,3;"FOOTE SOFTWARE
PRESENTS:"
920 PRINT AT 8,0;"      MATH FUNC
TION GRAPHER"
930 PRINT AT 20,0;"COPYRIGHT 19
83 BY FOOTE SOFTWARE"
940 PAUSE 200
950 CLS
999 RETURN
1000 REM
1010 PRINT AT 21,0;"PRESS ANY KE
Y TO CONTINUE..."
1020 PAUSE 33333
1030 CLS
1099 RETURN
1200 REM
1210 PRINT "

```

$$F(X) = 3X^3 + X^2 - X + 2$$

$$F(X) = 96.059862$$



Speech Synthesizer for the TS-1000

Now I've heard everything! A computer that talks back to me? why not...everybody else does!

Tad Painter has done the "unheard" of by digitizing the human voice for T/S computers. His SPEECH SYNTHESIZER program does the job without the need for expensive additional hardware. It's all software generated.

SPEECH SYNTHESIZER is available for the TS 1000/1500 and the 2068 computers. Each version includes a demonstration program that displays the capabilities of the software. The "voice" plays through the speaker of the 2068, and through the MIC jack of all three computers.

The vocabulary of the 2068 version contains 274 words in four libraries. Words from different libraries can be compiled together, and there is a program included that will enable you to use speech in your own programs.

Tad has the hardware available for 2068 owners to create their own vocabularies (\$39.95). He also has three talking programs for your enjoyment.

SPEECH SYNTHESIZER is a well done, quality program. I recommend it highly.

Now, if I could just get my 2068 to explain to my landlord why the rent is late...

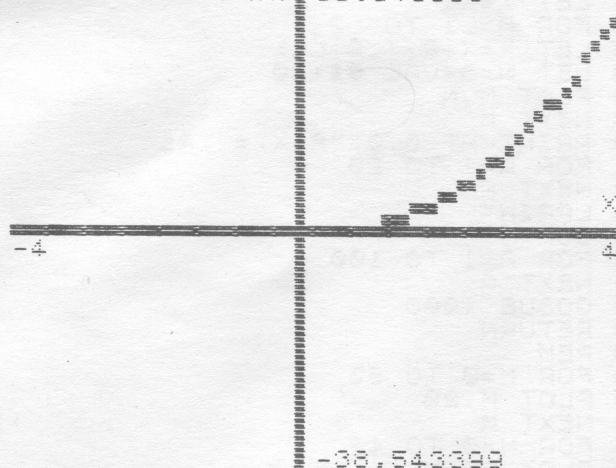
Available for \$16.95 from Tad Painter, Box 166055, Irving TX 75016.

-- Bill Ferrebee

1299 RETURN

$$F(X) = X^2 + 2$$

$$F(X) = 38.543399$$



The first personal computer for under \$200.

The Sinclair ZX80.
A complete computer—
only \$199.95 plus \$5.00 shipping.

Now, for just \$199.95, you can get a complete, powerful, full-function computer, matching or surpassing other personal computers costing several times more.

It's the Sinclair ZX80, the computer that independent tests prove is faster than all previous personal computers. The computer that "Personal Computer World" gave 5 stars for 'excellent value.'

The ZX80 cuts away computer jargon and mystique. It takes you straight into BASIC, the most common, easy-to-use computer language.

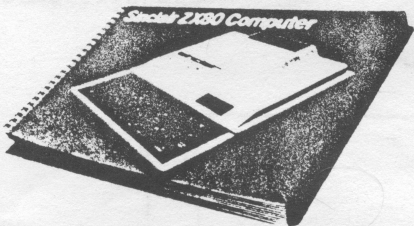
You simply take it out of the box, connect it to your TV, and turn it on. And if you want, you can use an ordinary cassette recorder to store programs. With the manual in your hand, you'll be running programs in an hour. Within a week, you'll be writing complex programs with confidence.

All for under \$200.

Sophisticated design makes the ZX80 easy to learn, easy to use.

We've packed the conventional computer onto fewer, more powerful LSI chips—including the Z80A microprocessor, the faster version of the famous Z80. This makes the ZX80 the world's first truly portable computer (6½" x 8½" x 1½" and a mere 12 oz.). The ZX80 also features a touch sensitive, wipe-clean keyboard and a 32-character by 24-line display.

Yet, with all this power, the ZX80 is easy to use, even for beginners.



Your course in computing.

The ZX80 comes complete with its own 128-page guide to computing. The manual is perfect for both novice and expert. For every chapter of theory, there's a chapter of practice. So you learn by doing—not just by reading. It makes learning easy, exciting and enjoyable.

The ZX80's advanced design features.

Sinclair's 4K integer BASIC has performance features you'd expect only on much larger and more expensive computers. These include:

- Unique 'one touch' entry. Key words (RUN, PRINT, LIST, etc.) have their own single-key entry and are stored as a single character to reduce typing and save memory space.
- Automatic error detection. A cursor identifies errors immediately to prevent



entering

programs with faults.

- Powerful text editing facilities.
- Also programmable in machine code.
- Excellent string handling capability—up to 26 string variables of any length.
- Graphics, with 22 standard symbols.
- Built-in random number generator for games and simulations.

Sinclair's BASIC places no arbitrary restrictions on you—with many other flexible features, such as variable names of any length.

And the computer that can do so much for you now will do even more in the future. Options will include expansion of 1K user memory to 16K, a plug-in 8K floating-point BASIC chip, applications software, and other peripherals.

Order your ZX80 now!

The ZX80 is available only by mail from Sinclair, a leading manufacturer of consumer electronics worldwide. We've already sold tens of thousands of units in Europe, so demand will be great.

To order by mail, use the coupon below. But for fastest delivery, order by phone and charge to your Master Charge or VISA. The ZX80 is backed by a 30-day money-back guarantee, a 90-day limited warranty with a national service-by-mail facility, and extended service contracts are available for a minimal charge.

Price includes TV and cassette connectors, AC adaptor, and 128-page manual.

All you need to use your ZX80 is a standard TV (color or black and white). The ZX80 comes complete with connectors that easily hook up to the antenna terminals of your TV. Also included is a connector for a portable cassette recorder, if you choose to store programs. (You use an ordinary blank cassette.)



The ZX80 is a family learning aid. Children 10 and above will quickly understand the principles of computing—and have fun learning.

Phone orders: (203) 265-9171. Mon.-Fri. 8 AM-6 PM EST. We'll deduct the cost of the call from your invoice. (For technical information, call (617) 367-2555, Mon.-Fri. 9 AM-5 PM EST.)

sinclair

Sinclair Research Ltd., 475 Main St.,
P.O. Box 3027, Wallingford, CT 06492.

To: Sinclair Research Ltd., 475 Main St., P.O. Box 3027, Wallingford, CT 06492.

Please send me _____ ZX80 personal computer(s) at \$199.95* each (US dollars), plus \$5 shipping. (Your ZX80 may be tax deductible.)

I enclose a check/money order payable to Sinclair Research Ltd. for \$ _____

Name _____

Address _____

City _____

State _____

Zip _____

Occupation: _____

Age: _____

Intended use of ZX80: _____

Have you ever used a computer? ☐ Yes ☐ No.

Do you own another personal computer? ☐ Yes ☐ No. *For Conn. deliveries, add 7% sales tax.

Upgrading to a "Real" Keyboard

E-Z Key Makes It Easy

Back in the September '85 issue of SUM, we ran an article on adding a large size keyboard to your computer. I find it necessary to bring it up again for this special issue.

A fullsize keyboard makes all the difference in the world and E-Z Key has made it easy to build your own keyboard interface for the ZX80/81, TS1000/1500/2068.

E-Z Key will supply the printed circuit board for \$9.95 + \$1.95 postage & handling. To get the circuit board and their most recent catalog, write to: E-Z Key, 711 Southern Artery, Quincy, MA 02169; (617) 773-1187.

The printed circuit board has plated thru holes and feed thru connector. This is the same interface that is used in their famous E-Z Key 60 keyboard. The edge connector is not included but can be purchased from Zebra Systems or found locally.

The circuit is very similar to the one that appeared last September. When installing the parts, be sure that the parts are aligned up correctly and keep the wiring to the keyboard as short as possible. Less than 18 inches. I have found that if you use ribbon cable, use every other wire for the data lines and

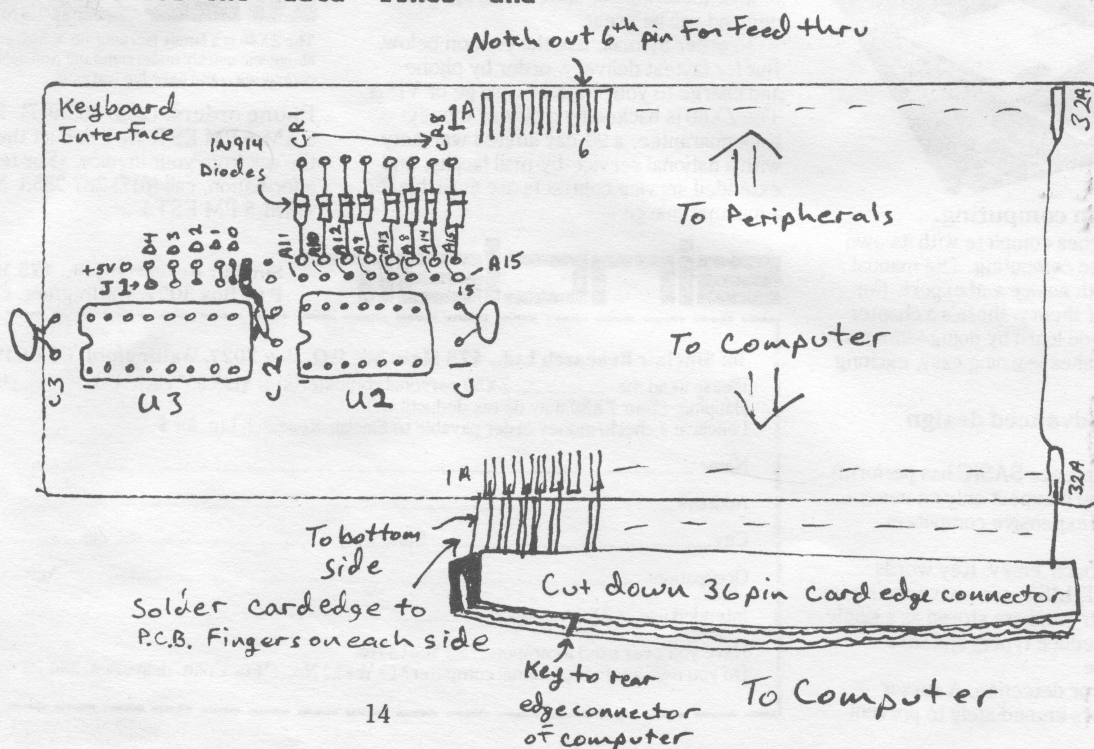
ground the ones in-between. This will help cut down on key errors.

The connection to the keyboard can be done through direct wiring from where it says J1 on the circuit board, or a 15 pin single inline plug (SIP) can be used. Follow the board layout closely. The notch for the feedthru connector needs to be cut. The place to cut is the sixth finger from the center of the board. Make sure that the key on the computer side of the interface also aligns with the sixth finger. These extra fingers are there for 2068 use also. Make sure the computer is unplugged while making any connections.

Once assembled, check for any loose wires, solder bridges or bad connections. Plug the interface in and turn on the computer to try it out. If any keys pressed gives something other than what it should be, turn off the computer and check again. You can add extra dedicated keys by the supplied schematic or the one shown in the September '85 issue.

This interface will work on all Sinclair computers (except the QL). And will greatly enhance the use of your computer. A completely assembled unit is also available from E-Z Key.

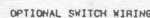
-- Joe Williamson



TS1000
BACK CONNECTOR



1. PLUG THIS MODUL INTO THE REAR EXPANSION PORT OF YOUR COMPUTER.
2. PLUG IN AN "E-Z KEY " OR ANY OTHER KEYBOARD THAT IS WIRED PER THE SUPPLIED SCHEMATICS INTO J1. (KEEP THE LEADS FROM THE KEYBOARD TO J1 LESS THAN 15 INCHES.)



NOTE:
J1 CONNECTS TO THE E-Z KEY " KEYBOARD INTERFACE " MODULE .

VENDOR REPORTS

Larken Electronics, RR#2 Navan Ontario, Canada K4B 1H9 has recently announced that they now have a disk drive system for the ZX81/TS1000 which can save BASIC arrays or code seperatly and does not use up any RAM. It will be compatible with their 2068 drive system also. We hope to review it in our next issue.

Gary Lessenberry is trying to reach other TS users in the Chicago area. Their address is: Chicago Area TSUG, 210 Bernice, Northlake, IL 60164. Or call (312) 473-9415 for more information.

Martin Helfgott is starting STARTING, the Sinclair Timex ARTificial INtelligence Group, an interactive, voice synthesized, Artificial Intelligence program. For more information contact: Martin Helfgott, Box 284, Bath Beach Station, Brooklyn, NY 11214.

Weymil Corporation is marketing Sinc-artist 1.3, a 256 x 192 high resolution program for the ZX81/TS1000/1500. One version is available which works with a hardware upgrade costing less than \$10. The package price is \$20. Weymil, Box 5904 in Bellingham, WA 98227.

PLEASANTREES PROGRAMMING, a long time ZX-81/TS1000 supporter, has once again made available their excellent book entitled Graphics A to Z. This book tells you how to use your TS1000 computer's graphics in BASIC, machine code, and even using Memotech's HRG module. Over 80 listings are included along with detailed instructions on animation, screen control, 3-D, memory paging, charts and graphs, etc. There is no other book I know of which supplies the answers which this book does. Cost is \$25 postpaid from Pleasantrees Programming, P. O. Box 2034, Mesa, AZ 85204.

Remember the Suntronics keyboard? This full size ZX-81/TS1000 compatible keyboard allows much greater and easier use of the "doorstopper's" keyboard. It is still available! It is one of the best peripherals you can purchase for your computer. Your computer mounts inside its case and all other connections are made to it just as to the original TS1000 keyboard. Cost is a very reasonable \$39.95 with fullsize spacebar from Sunset Electronics, 2254 Taravel Street, San Francisco, CA 94116; 415/665-8330.

Cassette 50 is a cassette tape with 50 different games on it--all for the TS1000/ZX-81. Though it has been around for several years now, it still represents excellent value for the money. 39 of the games will run in 1K, the other 11 with the 16K RAMpack. Games include "Radar Landing" (flight simulator), and "Psion Attack". Logical, tactical, maze, and arcade games are all included. Currently the company is also including a free digital calculator watch free with each purchase. Another version of Cassette 50 is available for the Spectrum (and 2068 with emulator) with games like Muncher and Frogger. Cost is \$18 (U.S.) per tape including postage and free watch. Order from Cascade Games Ltd., 1-3 Haywra Crescent, Harrogate, North Yorkshire, HG1 5BG, England. Phone (0423) 504663. They do accept MasterCard and Visa by phone.

Probably the most impressive catalog published in America for the TS1000 and TS2068 is that of E. Arthur Brown Co. Full-color covers, tabloid size, 12 pages -- I always sit down and read my latest copy from cover to cover when I receive it. With many illustrations and mini-reviews of most products, it provides an added incentive to order from the company. It would probably help if you sent along \$1 to help with postage when requesting the newest edition. E. Arthur Brown Co., 3404 Pawnee Drive, Alexandria, MN 56308; 612/762-8847.

Have you ever dreamed of your humble TS1000 having color, 64 columns on screen, and bit-mapped graphics? How about a continuous screen display even in FAST mode and a FAST mode that really is FAST? Perhaps you haven't heard about the Oliger TI Video Upgrade. Fully assembled and tested units are available for \$97.50 ppd. or as a kit for the hobbyist to assemble for \$49.95 (does not include one chip). Unassembled units from John Oliger Co., 11601 Whidbey Drive, Cumberland, IN 46229. Assembled units from Fred Nachbaur, C-12, Mtn. Station, Group Box, Nelson, BC V1L 5P1 Canada. Send at least \$1 to each for a catalog of the many great products they each supply for the TS1000.

A new book! It has been a while since a brand new book has come out for our computers, but 200 Computer Programs in Basic for the TS-1000, ZX-81, and TS-2068 is now available. Price is \$9.50 postpaid from BIT/S Software, 3202 W. Fillmore, Phoenix, AZ 85009. Programs include

Sundial, TS/ZX Word Processor, Supergraph, NFL Predictions, and much more.

ZX Broadsheet is a quarterly publication devoted entirely to advanced applications on the ZX-81/TS1000 computers. Back issues are available. Cost is about \$2.50 per issue. All 20 back issues are currently available. Several excellent programs are also available including Extended Basic. Order the current issue and ask for a catalog. ZX Broadsheet, Nick Godwin, 4 Hurkur Crescent, Eyemouth, Berwickshire, Scotland TD14 5AP.

Whether using the original keyboard or an enhanced Suntronics or other keyboard with your computer, the Compusa Bleeper System can make keyboarding easier. The Bleeper provides a "beep" each time a key is pressed, allowing you to touch type on the enhanced keyboards, and stop looking back and forth from keyboard to screen on the original keyboard. The Bleeper is available for \$9.00 postpaid from E-Z Key, 711 Southern Artery Suite 75, Quincy, MA 02169.

There is a ZX-81/TS-1000 user's group in England which would like American members. For more information, send a self-addressed envelope to ACV, 1 Foxwell Square, Northampton NN3 5AT, England. They say they have new software available.

Tape Makes a Difference

Since my years with the ZX81 and some time with the TS2068, I have fought the idea of adding another peripheral such as a Winky Board or any other type of amplifier and/or filter. I guess I'm fussy but I hate clutter in my computer area. So I've endured lost data, blaming it on the cassette recorder. In fact, I ended up by buying three recorders. Eventually, I went back to the first one, a Sony TCM-121, and had to run it "wide open" to get a good load on various brands of tape. A small, mostly defunct user group I once led had a "group buy" of cassettes once and we placed it with an outfit in Des Plaines, Illinois. In bulk, their prices per tape were the best we'd seen. The tape we'd selected out of the six offered still had me running at full volume. (This rates a "10" on my recorder since the volume control is marked from 1 - 10.)

Thinking of the wide selection they had, I called Polyline Corp., the distributor of the tape we'd gotten on the group buy. When I asked the sales rep about comparisons between four types of tape, she sent a sample of each for me to try.

A test was run in this manner: using the Tasword II word processor program, I wrote a short article and SAVED it to each cassette, one after the other. Next, I cleared the text from memory, set the volume control arbitrarily at "7" and was unsuccessful in LOADING the text from a BASF LHD cassette. Undaunted, I reset it at "8" and got a good LOAD. This means that I only needed 80% of the volume compared to any previous LOAD! Well, if the BASF was that good, what would the Magnetite 12 do for me? Since the text was already SAVED, I set the volume control to "7" once again, cleared the text, and LOADED. It worked. Try "6". It worked, too! And with the Ampex 615/616 and Agfa 611/811 tapes could LOAD safely at "5" -- 50% of the volume required before the test!

No \$12 amplifier, no \$20 Winky Board, nothing more than more sensitive tape. Not only that, but the Agfa 615/616 C-10 tape cost only 34.9 cents per cassette when bought in a lot of 100, even less in greater quantities.

This is an unsolicited testimonial, not an advertisement. User groups or individuals who would like to get in on a good thing should call Polyline Corporation at 312/298-5300 or 312/297-0955 and ask for a free catalog #85P1. The rest is up to you.

-- John L. Donaldson

Where to Find ZX-81/TS-1000/TS-1500 Suppliers

The following is a list of ZX81/TS 1000/1500 dealers. Included is a brief rundown of what they carry (hardware or software or both). This is fairly up to date, but not all have been checked out. They are in no particular order.

* Byte-Back Inc., RT4 Box 54, Leesville, SC 29070 (814) 364-1325. Hardware: Real time clock, modem, 64K RAM.

* Simulusion, Box 2382, La Jolla, CA 92038 Software from \$.99 to \$1.79, printer paper

* Hal-Tronix, Inc., PO Box 1101, Dept. HR, Southgate, MI 48195 (313) 285-1782. ZX-81, power supply, printer paper.

* Thomas B. Woods, PO Box 64, Jefferson, NH 03583, (603) 586-7734. Software & Hardware, Ext. BASIC, updated ROM, SyncWare News Magazine.

* Weymil Corp. Box 5904, Bellingham, WA 98227-5904, Hi-Res software.

* Foote Software, PO Box 14655, Gainesville, FL 32604. Software.

* Larken Electronics, RR#2 Navan Ontario, Canada K4B 1H9. Disk Drives.

* WMJ Data Systems, 4 Butterfly DR, Hauppauge, NY 11788. Software.

* Time Designs Magazine Co. 29722 Hult Rd, Colton, OR 97017. Books.

* JRC Software, PO Box 448, Scottsburg, IN 47170. Software.

* A. F. R. Software 1605 Pennsylvania Ave. #204, Miami, FL 33139. Software

* Games To Learn By, Inc., PO Box 575, Williamsburg, MA 01096. (413) 268-7505. Software and Hardware, full size keyboards.

* Computer Trader Magazine, 1704 Sam Dr, Birmingham, AL 35235. Programs.

* Tom Cole 1314 Speight #15, Waco TX 76706 Software, Fastfile.

* HCS Software, PO BOX 1754, Portsmouth, OH 45662. Software.

* Zebra Systems, Inc., 78-06 Jamaica Av., Woodhaven, NY 11421 (718) 296-2385. Hardware, Software, books, a little of everything.

* Aerco Electronics, Box 18093, Austin, TX 78760. (512) 451-5874. Disk drives, printer interfaces.

* Basically Programming, 2528 W. Olive Avenue, Fullerton, CA 92633. Software, hardware, I/O board.

* Sunset Electronics, 2254 Taraval Str., San Francisco, CA 94116. (415) 665-8330. Hardware, Software, books, large selection

* Russell Electronics, RD 1 Box 539, Centre Hall, PA 16828. (814) 364-1325. Software (Hi-res).

* E-Z Key, Suite 75, 711 Southern Artery, Quincy, MA 02169. Software, hardware, keyboards.

* ISI, 3770 Duke RD. RR#1, Victoria B.C., Canada V8X 3W9. Hi Res software.

* Tad Painter, Box 166055, Irving, TX. Voice software.

* Delphic Enterprises, PO BOX 72205, Corpus Christi, TX 78472. Utility EPROMs.

* A & J Micro Drive 1050 E. Duane Ave. Suite "I", Sunnyvale, CA 94086 (408) 732-9292. Microdrives.

* The Widjup Co. 1120 Merrifield S.E., Grand Rapids, MI 49507. Software.

* E. Arthur Brown Co., 3404 Pawnee Dr., Alexandria, MN 56308 (612) 762-8847. Software, hardware.

* Fred Nachbaur, Silicon Mountain Computers, C-12, Mtn. Stn. Group Box, Nelson, BC, Canada V1L 5P1. software, hardware, video upgrade.

* TS Horizons, 2002 Summit Str., Portsmouth, OH 45662. Programs, articles.

* Budget Robotics & Computing, Box 18616, Tucson, AZ 85731. Computer control projects.

* Kraig Pritts-KA2LHO, 3421 Oneida St., Chadwicks, NY 13319. Software for HAM's.

* Sirius Ware, 6 Turning Mill Rd., Lexington, MA 02173. Software.

* SUMWARE PO Box 13, Ellenton, FL 33532. Software, hardware.

That about wraps up the list. If I missed anyone, I'm sorry but please let me know so I can include you at a later date.

Joe Williamson

CLASSIFIEDS

FOR SALE: TS2068 color computer, user manual, in original carton, like new condition. Over 75 pages third party software guide and technical manual, schematic diagram, Aerco centronic printer interface with printer driver and instructions. Textwriter 2000+, Pro/file, Flight Simulator, VuCalc, Checkbook Manager with instructions. Magazines: Sync, Timex Sinclair User, TS Horizons, SUM. All for \$325. Glenn Blizzard, 614 Hollywood Ave., Suffolk, VA 23434.

FOR SALE: Aerco floppy disk interface for the 2068. Includes two 5 1/4" disk drives. Like new. \$275. Please call 212/535-1651.

UPGRADING: Selling TS2068, Winky Board 2000, Aerco 2068 i/f, Gorilla Banana printer, Zebra Pen + software, Pro/file enhanced, Textwriter 2000+, Appointment-Scheduler by Zebra, Tutor. Nine 2068 books. SASE D. R. MacLeod, 1906 Ashley Drive, Phenix City, AL 36867 for complete list. 205/2970634 after 9 p.m. E.D.T.

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SOFTWARE CLOSEOUT. TS-1000/ZX-81 software from 99 cents! Simulusion, Box 2382, La Jolla, CA 92038.

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FOR SALE: I have TS-1000s that have been tested and/or repaired. \$10 each. Also parts for the above. Call or write for prices. 216/944-8630; Dean Miller, 29324 Park St., Wickliffe, OH 44092.

WANTED: "Banner Program" for 2068 to produce 4" high letters sideways on 2040 printer. I will trade 2068/Spectrum software for a taped copy. First to write with details gets a deal! Sumware, POB 13, Ellenton, FL 33532.

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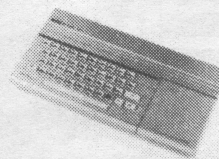
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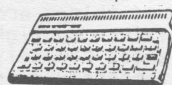
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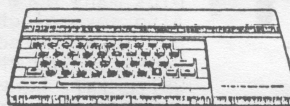
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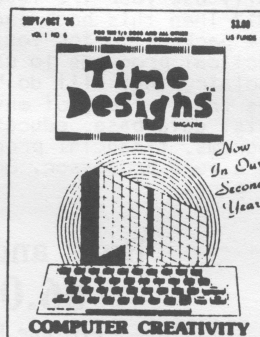
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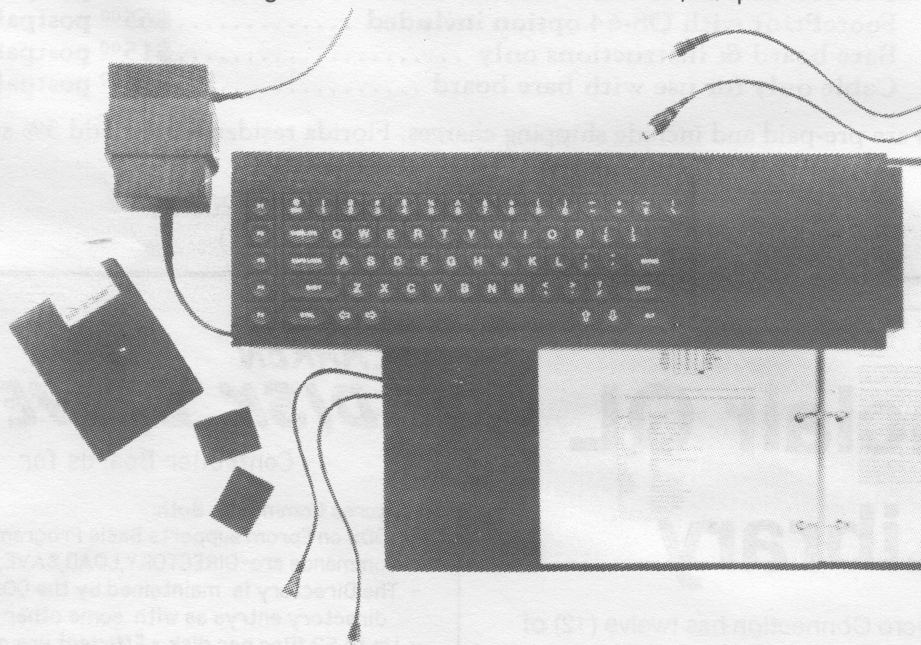
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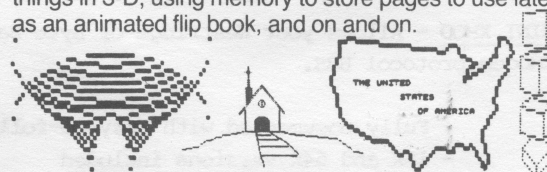
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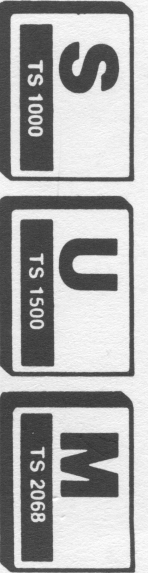
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